

What is claimed is:

1. A display device comprising:

a cell having a side, the cell containing a suspension fluid and at least one suspension particle dispersed within the suspension fluid, the suspension particle
5 being adapted to migrate in the suspension fluid under the influence of an electric field; and

a light waveguide layer extending adjacent to at least the side of the cell, the light waveguide layer adapted to conduct light into the cell through the side of the cell.

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2. The display device of claim 1 in which the light waveguide layer has a first surface and a first end of the cell extends beyond the first surface of the light waveguide layer.

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3. The display device of claim 2 in which the side tapers outwardly from the first surface toward an opposite second surface.

4. The display device of claim 3 in which the light waveguide layer extends around the sides of the cell.

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5. The display device of claim 4 in which a second end of the cell extends beyond the second surface of the layer.

6. An electrophoretic display device comprising:

a plurality of capsules, each capsule having a narrow end and a broad end, and sides connecting the ends, each capsule containing a suspension fluid and a plurality of suspension particles dispersed within the suspension fluid, the suspension particles being adapted to migrate in the suspension fluid under the influence of an electric field;

a light waveguide layer surrounding the sides of the capsules and adapted to conduct light along the light waveguide layer and laterally into the capsules through the sides, the narrow ends of the capsules extending through the light waveguide layer; and

electrodes supported adjacent to opposite ends of the capsules.

7. A method of making a display element comprising:

forming a light waveguide layer adapted to transmit light along a light path defined by the light waveguide layer; and

forming a cell containing a suspension fluid and at least one suspension particle dispersed within the suspension fluid, the suspension particle being adapted to migrate in the suspension fluid under the influence of an electric field, the cell extending into the light waveguide layer.

8. The method of claim 7 further comprising directing light along the light waveguide layer and laterally into the cell through the side of the capsule.

9. The method of claim 7 in which forming a cell includes forming a membrane enclosing the suspension fluid and at least one particle, the method further comprising forming a passageway extending through the light waveguide layer, and positioning the cell in the passageway with a portion of the cell extending beyond the light waveguide layer.

10. The method of claim 9 in which forming a passageway includes forming a passageway tapering between a first opening and a second opening smaller than the first opening, and positioning the cell includes inserting the cell into the first opening.

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11. The method of claim 9 in which positioning the cell includes at least one of pressing the cell into the passageway, and pulling the cell into the passageway.

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12. The method of claim 11 in which forming a passageway includes forming a passageway between first and second openings, positioning the cell includes positioning the cell against the first opening, and pulling the cell includes applying a reduced ambient pressure to the second opening sufficient to draw the capsule into the passageway.

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13. The method of claim 12 in which the passageway extends through the light waveguide layer, and applying a reduced ambient pressure includes applying a reduced ambient pressure sufficient to draw the portion of the cell through the passageway until the portion extends beyond the light waveguide layer.

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14. A method of shaping a capsule for a display device comprising:
forming a generally spherical capsule;
pulling a first portion of the capsule away from a second portion of the capsule, and thereby elongating the capsule between the first and second portions; and
maintaining the capsule in the elongated condition.

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15. The method of claim 14 further comprising restraining the second portion of the capsule while pulling the first portion of the capsule.

5 16. The method of claim 15 in which restraining the second portion includes positioning the capsule against the mouth of a passageway in a substrate, and pulling a first portion includes pulling the first portion into the passageway.

10 17. The method of claim 16 in which pulling a first portion includes applying a reduced ambient pressure to the passageway sufficient to draw the capsule into the passageway.

15 18. The method of claim 16 in which the passageway extends through the substrate, and pulling a first portion further includes pulling a first portion through the substrate until the first portion extends beyond the substrate.

19. The method of claim 18 in which maintaining the capsule in the elongated condition includes retaining the capsule in the passageway.

20 20. The method of claim 14 in which forming a capsule includes forming a capsule containing an electrode plate disposed adjacent the first portion, and pulling a first portion includes pulling on the electrode plate sufficiently to draw the first portion away from the second portion.

25 21. The method of claim 14 in which forming a capsule includes forming a capsule made of a thermoplastic material, the method further comprising heating the first portion of the capsule, and pulling a first portion includes pulling a first portion while the first portion is heated.

22. The method of claim 14 further comprising restraining the second portion of the capsule while pulling a first portion of the capsule.

23. The method of claim 22 in which restraining the second portion
5 includes anchoring the second portion in a substrate.

24. The method of claim 23 in which anchoring the second portion includes anchoring the second portion in a light waveguide layer.

10 25. The method of claim 14 in which pulling a first portion includes securing the first portion and suspending the second portion.

26. The method of claim 25 in which forming a capsule includes forming a capsule made of a thermoplastic material, the method further comprising
15 heating the second portion of the capsule, and suspending the second portion includes suspending the second portion while the second portion is heated.

27. The method of claim 26 further comprising supporting the second portion on a surface opposite the first portion, and cooling the second portion.

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28. The method of claim 26 further comprising cooling a part of the second portion adjacent to the first portion while suspending the second portion.

29. A display device comprising:

25 cell means containing a suspension fluid and at least one suspension particle dispersed within the suspension fluid, the suspension particle being adapted to migrate in the suspension fluid under influence of an electric field; and

light waveguide means extending adjacent a side of the cell means, the light waveguide means being adapted to conduct light into the cell means through
30 the side of the cell means.